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| (74) Agents: DWORETSKY, Samuel, H. et al.; AT & T Corp., P.O. Box 4110, Middletown, NJ 07748 (US). | | | |
| (54) Title: MAXIMUM LIKELIHOOD DETECTION OF CONCATENATED SPACE-TIME CODES FOR WIRELESS APPLICATIONS WITH TRANSMITTER DIVERSITY | | | |
| <pre>graph LR In(()) --> 10[TCM ENCODER] 10 --> 20[BLOCK ENCODER] 20 --> 30[RF] 30 --> 31[Antenna 31] 30 --> 32[Antenna 32] 40[Antenna 40] --> 50[SPACE BLOCK COMBINER] 50 --> 60[VITERBI DECODER] 60 --> Out(())</pre> | | | |
| (57) Abstract | | | |
| Good transmission characteristics are achieved in the presence of fading with a transmitter that employs a trellis coder followed by a block coder. Correspondingly, the receiver comprises a Viterbi decoder followed by a block decoder. Advantageously, the block coder and decoder employ time-space diversity coding which, illustratively, employs two transmitter antennas and one receiver antenna. | | | |

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/21959

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 H04B7/06 H04L1/00 H04L25/03 H04L1/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04B H03M H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | <p>SESHADRI N ET AL: "SPACE-TIME CODES FOR WIRELESS COMMUNICATION: CODE CONSTRUCTION" 1997 IEEE 47TH. VEHICULAR TECHNOLOGY CONFERENCE, PHOENIX, MAY 4 - 7, 1997, vol. 2, no. CONF. 47, 4 May 1997, pages 637-641, XP000736685</p> <p>INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, New York, USA.</p> <p>see abstract</p> <p>see page 637, left-hand column, paragraph 3 - paragraph 4</p> <p>section 2</p> <p>section 3</p> <p>section 4</p> <p style="text-align: center;">---</p> <p style="text-align: center;">-/--</p> | 1,2,6,7 |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| X | SESHADRI N ET AL: "ADVANCED TECHNIQUES FOR MODULATION, ERROR CORRECTION, CHANNEL EQUALIZATION, AND DIVERSITY" AT & T TECHNICAL JOURNAL, vol. 72, no. 4, 1 July 1993, pages 48-63, XP000415859 page 57, section "Diversity using multiple transmit antennas" see page 58, last paragraph --- | 1,2,6,7 |
| P,X | ALAMOUTI S M: "A simple transmit diversity technique for wireless communications" IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS, OCT. 1998, IEEE, USA, vol. 16, no. 8, pages 1451-1458, XP002100058 ISSN 0733-8716 the whole document --- | 1-17 |
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In. ational Application No

PCT/US 98/21959

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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| E | WO 99 14871 A (AT & T WIRELESS SERVICES INC) 25 March 1999 cited in the application the whole document ----- | 1-17 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. l. Application No

PCT/US 98/21959

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